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LACHRYMATION: ITS CAUSES AND TREATMENT.¹

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BY lachrymation is meant either a hypersecretion of tears or else some obstruction to their passage into the lachrymal sac and nasal duct. To the first of these conditions the older writers² were in the habit of giving the name of "epiphora," to the latter that of "stillicidium." These terms have now become more or less obsolete, and are both usually included under the more general designation of "lachrymation."

Hypersecretion of tears is, comparatively speaking, a rare condition. Apart from emotional causes it occurs chiefly in connection with irritation of the conjunctiva, such as by the presence of a foreign body, by injury to the conjunctiva as by chemical fumes; it is also a frequent accompaniment of inflammatory diseases of that membrane. In these last instances, however, it is difficult, if not impossible, to say how far the apparent hypersecretion of tears is due to the action of the lachrymal gland, and how far it is merely the increased discharge from the inflamed membrane itself.

In many cases of eye-strain, particularly those due to an error of refraction or insufficient power of accommodation, lachrymation is often a prominent feature. The connection between the one condition and the other is not quite apparent, but that such exists should never be forgotten by the practitioner in dealing with lachrymation of apparently obscure origin. Very often accurate correction of an error of refraction will entirely relieve a patient from an annoyance which has troubled him for many years.

Probably the most frequent cause of lachrymation is some obstruction to the elimination of the tears by the usual passages. After they are secreted they pass over the eyeball

¹ Read at a meeting of the Glasgow Medico-Chirurgical Society held on 31st January, 1908.

² Mackenzie, fourth edition, p. 85.

and are taken up by the superior and inferior puncta, which are two small apertures found respectively on the edge of the superior and inferior eyelids near the internal canthus. The opening of each punctum is in health directed towards the eyeball, and opens into a small channel called the canaliculus. Usually the two canaliculi coalesce before entering the lachrymal sac. From the lachrymal sac the tears find their way into the nasal duct.

Lachrymation may be due to obstruction at the punctum, in the canaliculus, or in the sac and nasal duct. In a few rare instances the punctum and canaliculus seem to be absent altogether, or, at best, represented by the merest vestige. In such a case little can be done to remedy the inconvenience. If the lachrymation is troublesome the question of removing the lachrymal gland may arise. Sometimes there is marked stenosis both of the punctum and of the canaliculus; here gradual dilatation is often possible. Generally speaking, this is best effected by means of Mr. Nettleship's lachrymal dilator, which is an exceedingly useful and convenient instrument for the purpose. After the passages have been enlarged by its means probes may also be passed. Later we shall return to the discussion of the best forms of probes. It is, meantime, enough to say that probably the best yet obtainable are the original probes of Bowman.

Lachrymation is also frequently caused by displacement of the position of the lachrymal punctum. In health the orifice points directly towards the eyeball, but in various pathological conditions the opening is directed upwards, or even outwards, so that it no longer subserves the purpose of drainage. The most common cause of such a displacement is chronic inflammation of the conjunctiva and of the margin of the eyelids. Occasionally in advanced years the orbicularis muscle loses its tonicity, allowing the inferior lid to fall downwards. The same condition is found in paralysis of the seventh nerve. Finally, such displacements are sometimes due to cicatrices of the face caused either by disease or by injury.

The treatment of this form of lachrymation depends entirely upon the etiological factor. So far as is possible the condition causing the outward displacement of the eyelid should be removed by suitable treatment. Where the malposition arises from relaxation of the orbicularis muscle (paralytic or otherwise) much good may often be effected by the shortening of the lower eyelid. Where the displacement is caused by hypertrophy of the conjunctiva the operation described by us in vol. xxiv of the *Transactions of the Ophthalmological*

Society of the United Kingdom is extremely useful, and generally gives a permanently good result. In some of these eversion cases the slitting of the canaliculus with a Weber's or Stilling's knife is sometimes justifiable and even necessary. After the performance of this small operation the drainage takes place from the inner extremity of the internal canthus. The objection to this operation is that the punctum and canaliculus are permanently destroyed, therefore it is an operation which should not be employed so long as there is a chance of the punctum being restored to its usual position. We concur with those who think it a mistake to use either of the knives above specified for the purpose of probing the nasal duct. In some of these cases the bony canal is rough and tortuous, and there is then always a danger that the point of the fine knife may become broken off in the canal. The instrument is a knife, not a probe.

We are of opinion that these eversion cases are the only ones in which it is legitimate to slit up permanently the whole of the canaliculus and the punctum. In others it may be necessary to dilate the punctum and even the canaliculus in a temporary manner so as to introduce the nozzle of the syringe or other instruments. It ought always to be remembered that if once the punctum is destroyed that the drainage can never be so good as if the punctum were present and in its proper position. Consequently, dilatation prior to the introduction of the nozzle of a syringe should always be effected by Nettleship's instrument. As a matter of fact it is generally found that lachrymation continues to be troublesome in those cases in which the punctum and canaliculus have been permanently slit open.

Probably the most important group is that due to pathological changes either in the sac itself, in the nasal duct, or at the point of junction of these two structures. Many writers express the view that such cases of obstruction are due to stricture of the orifice between the sac and the duct, that this condition is primary, and that the retention of tears and suppuration are secondary. While not denying the possibility of stricture in this situation, nor the fact that if stricture does take place, there will be retention of tears, it seems to us that the vast majority of these cases is to be explained by a septic or inflammatory condition of the mucous membrane of the sac, and that the closure of its inferior opening is secondary to this condition and is not primary. The internal surface of the sac is not smooth, but is rugose, and is apt to become infected by such organisms as the pneumococcus and

streptococcus.¹ Moreover, the structure is at times attacked by tubercle, and occasionally it is found to be the seat of malignant disease. The obstruction is generally due to the presence of some such condition, and is not primary. It is *post hoc* not *propter hoc*.

Once a septic condition is determined in the wall of the sac subsequent inflammation is either acute (acute dacryo-cystitis) or chronic (chronic dacryo-cystitis). In acute cases the symptoms are sometimes very severe. There is swelling and tenderness over the sac, the eyelids generally become much swollen, and the whole of the surrounding parts of the face may be erythematous. There is, generally speaking, a certain amount of constitutional disturbance; thus it is by no means infrequent to find increase of temperature, rigor, and even vomiting. In such circumstances it is almost impossible, and perhaps not rational, to distinguish between acute dacryo-cystitis and erysipelas, all the more so that in these very acute cases the streptococcus is frequently found. The patient suffers severely from pain, and ultimately an abscess forms, which if left alone will open externally on the face and may leave a permanent opening. In other cases, however, the wound heals and gives place to a chronic dacryocystitis. In course of time, however, the acute stage is likely to recur and go through the same process of supuration. Indeed, one occasionally sees patients who have had intermittent attacks for many years.

The pyogenic mucous membrane, however, does not always give rise to acute dacryo-cystitis. Many persons have such a condition for a long series of years without ever having an acute exacerbation. The danger in such instances is chiefly the fear of corneal infection in the event of the epithelium of that structure becoming abraded. So great is the danger that many years ago I removed a sac for dacryo-cystitis before operation for cataract. That must have been one of the first cases of sac extirpation for chronic dacryo-cystitis done in this country. In the acute stage the treatment must necessarily be expectant. It is not admissible, but, on the contrary, even dangerous to pass probes. The pain caused by the inflammation may often be greatly relieved by the local application of a little of the green extract of belladonna suitably moistened with glycerine. When an abscess forms it should be opened externally and the pus allowed to escape. . . . So soon as it becomes quiescent then more active

¹ See the excellent papers by Tartuferi on the "Development of the Sac."

treatment may be employed. In the latter state probes of small calibre should be introduced. They may be passed down the nasal duct, and after their withdrawal the cavity should be thoroughly irrigated with tepid normal saline. Little difficulty is experienced in passing a probe. The edge of the lower lid at the inner canthus is drawn tight by the fingers of the hand in which the probe is not held, and the point of the probe is introduced into the punctum; it is then shoved along the canaliculus, and, lastly, it is directed down the sac in a line from the internal canthus to the fold of the ala of the nose. Large probes, such as those of Theobald, are apt to do harm, from the fact that they bruise and even cause lacerated wounds in the tissues, thereby allowing the micro-organisms to get into the freshly-wounded tissues. Not infrequently in such cases careless or rough probing has given rise to an acute cellulitis extending to the orbit and even across the bridge of the nose to the other side of the face. The nearer to its point a probe is held in the surgeon's hand the better, for the less the leverage the less the probability of tearing or lacerating the soft tissues, and hence the less the likelihood of septic infection in the surrounding parts. For these reasons we prefer the probes of Bowman or the smallest size of Snellen's silver probes to the huge instruments sometimes seen. The large probes introduced into practice by Theobald ought not, in our opinion, to be used at all.

Frequently the patient is ordered by the surgeon to empty the contents of the sac into the nasal passages by the simple process of pressing the sac itself. Very often such a practice is continued for years, and the patient thereby is kept in comparative comfort. Such a proceeding, however, is not altogether free from danger. Occasionally the patient exerts too much pressure, with the result that some of the septic matter is extruded through the membrane constituting the wall of the sac and infects the surrounding cellular tissue. Moreover, although the patient may be kept in comparative comfort for a number of years, still there is always lurking the danger of corneal suppuration in the event of that membrane losing its protecting epithelium.

In all cases of dacryo-cystitis judicious probing, with thorough washing out of the sac, should be carried out systematically in the first instance. Probably benefit is also to be derived from injecting into the sac a few drops of a 10 per cent solution of protargol. This, however, should be done carefully, for if the fluid find its way out of the sac so

as to infiltrate the skin lying above it, it is apt to give rise to an unsightly and permanent argyrosis.

Where the condition is not relieved by this treatment, and especially in those cases in which chronic dacryo-cystitis gives place every now and again to an acute attack, it is generally advisable to remove the pyogenic membrane altogether by excising the sac. The details of this operation are already well known, so that it is unnecessary to mention them here. One of the best forms of operation is that recommended by Dr. Lewis M'Millan in the *Glasgow Medical Journal* for 1907.

The results of extirpation are all but invariably satisfactory. Disappointment seldom arises, but when it does, it is generally found that a portion of the pyogenic membrane has been left after the closure of the wound, and that it has given rise to the formation of an abscess. Patients make an excellent recovery from this operation, and, what is very remarkable, they almost never suffer afterwards from lachrymation, but are extremely comfortable. If in any particular case the patient should still complain of lachrymation, then the question of the removal of the lachrymal gland would naturally arise. This can very easily be effected by the double eversion of the upper eyelid followed by an incision through the conjunctiva overlying the gland.

To sum up. On no account should the canaliculus ever be slit in dacryo-cystitis. Such an operation is nothing less nor more than a piece of very bad and crude surgery. As well might you divide up another organ from its external meatus to its membranous portion for stricture in this latter situation. Probing should be little resorted to. A fine probe may be passed so as to ensure that the fluids with which you hope to cleanse the pyogenic membrane find their way into the nasal cavity. Probably the only good set of probes on the market are these of Bowman. Large probes should never be used, as they are apt to cause laceration of the tissues. It is steadily to be kept in mind that in dacryo-cystitis we are dealing primarily with a septic mucous membrane and not with a stricture. No drug that can be used is bactericidal, so that if drainage and washing do not avail to remove the septic condition, then probably the best line of treatment is the destruction of the sac either by caustic or by extirpation. It seems to me that a man who uses a very large probe has entirely failed to grasp the pathological condition: he makes the radical mistake of regarding the primary condition as a stricture, whereas in reality it is a septic mucous membrane.

